in natural science of the value of £60 per annum, with laboratory fees not exceeding £20 per annum, on December 11 next. The examination will consist of papers in biology and chemistry, and all inquiries respecting the examination should be addressed to Mr. W. Hatchett Jackson, Keble College. The examination will begin on Thursday, December 6.

Mr. R. Warington, F.R.S., has been elected to the Sibthorpian Chair of Rural Economy, in succession to Sir John Gilbert.

CAMBRIDGE.—This year, for the first time on record, there is a bracket of two for the Senior Wranglership. In 1887 four names were bracketed for the highest place. These are the only instances in which the Senior Wrangler of the year has not stood "alone in his glory." Messrs. W. S. Adie and W. F. Sedgwick, both of Trinity College, share the honour. There is one lady wrangler, Miss E. H. Cooke, of Girton, who is bracketed twenty-eighth. In the second part of the Mathematical Tripos, a lady of Newnham, Miss A. M. J. E. Johnson, who was between fifth and sixth in the first part last year, heads the list, as she is placed alone in the first division of the first class. The Tyson Medal, for astronomy, offered this year for the first time, is not awarded.

Seven names appear in the first list of the Mechanical Sciences Tripos, all three of those in the first class having already taken the B.A. degree on some other examination.

The Harkness Studentship in Geology has failed of award, in the absence of candidates.

The degree of Sc.D. is to be conferred on Professor Demetri Ivanovitch Mendeléef, of St. Petersburg, who was not able to accept the honour when it was offered him in 1889.

The following are appointed examiners for the new diploma in Agricultural Science: W. F. Darwin, Mr. W. G. P. Ellis, Professor Liveing, Mr. T. B. Wood, Professor Foster, Mr. A. Eichholz, Mr. A. E. Shipley, Mr. C. Warburton, Professor Hughes, Mr. P. Lake, Mr. O. P. Fisher, Mr. E. Clarke, and Mr. R. Menzies.

THE Scottish Association for the Promotion of Technical and Secondary Education have presented a memorial to Mr. Acland asking that the yearly examinations of the Department of Science and Art shall be held in the day as well as in the evening. It is pointed out that originally arranged, as they were, to suit the convenience of artisan pupils who could not be expected to attend during the day, these evening examinations are now taken by large and increasing numbers of pupils of secondary and higher grade schools. While, therefore, fully recognising the necessity which exists for examinations in all stages of art and science subjects being continued in the evening as heretofore, the memorialists urge the desirability of provision being made by the Department for the examination, within school hours, of pupils attending day schools.

SIR PHILIP MAGNUS has been appointed to represent the University of London at the bicentenary celebration of Halle University, to be held in August next.

SCIENTIFIC SERIALS.

Bulletin de l'Académie Royale de Belgique, No. 3.—Experimental demonstration of the purely accidental character of the critical state, by P. de Heen. A small quantity of amylene was introduced into the bottom of a tube, and surmounted by mercury, the tube being so thin that the mercury remained at the top. The tube was placed inside a box with glass windows, which was then heated to temperatures ranging from 201° C., the critical temperature of amylene, to about 350°. The tube was connected at the top with a Cailletet compression apparatus. It was found that even under pressures less than 5 atmospheres the amylene could be heated to 350° without evaporating. The critical state, characterised by turbulent movements, was never exhibited, but if by some accident a small quantity of vapour was formed the critical state set in at once. The author concludes that the critical state consists of a non-homogeneous mixture of "liquidogenic" and "gazogenic" molecules. At a certain high temperature, estimated for most liquids at 800° or 900°, the former are completely dissociated, and the pressure-volume curve becomes a simple isothermal. But the state of a fluid is not defined by pressure and temperature alone, since at the critical temperature, and at zero pressure, the volume can vary from unity to infinity.—Facts relating to the properties of carbon bisulphide, by H. Arctowski. The boiling point of pure carbon bisulphide is 46°·27, but this rises steadily during the process of determining it. The bisulphide is partially decomposed by the sun's rays, by moist air, and by a slight elevation of temperature continued for some time.—On the solubilities of the haloid salts of mercury in carbon bisulphide, by the same author. These salts show different solubilities, the iodide being the most, and the chloride the least soluble. The solubilities show a point of upward inflection at about 15° C. From 15° to −10° the lines of solubility converge in such a manner that if produced they would meet the axis of solubilities at a point corresponding to −25°.—Some experiments in experimental pathological embryology, by P. Francotte. Some ova of *Leptoplana tremellaris* were opened with a find steel point to admit schizomycetes. The microbes were either digested or excreted. The author concludes that microbian diseases cannot be transmitted by either ova or spermatozoa.

THE *Meteorologische Zeitschrift* for May contains a discussion of the results of meteorological observations on the Pic du Midi, by Dr. F. Klengel. The observations dealt with are those made during the years 1874-81 (excepting 1877), at the Plantade station, situated at a Pass, at an elevation of 7760 feet, and they furnish important materials respecting the climatic peculiarities of the high Pyrenees. The mean temperature was 34°·2; the absolute minimum was −11°·2 in Jauuary 1878, and the maximum 77°·4, in August 1881. Frost was observed on an average on 224 days in the year; the absolute maxima in all months were above 32°, and the minima mostly below 32°, even in July and August. The rainfall was exceedingly copious, amounting in the year to no less than 93·5 inches, a quantity which is only equalled at a few other places in Europe. The wettest month was April, with 18 inches, and the dryest July, with 2·7 inches. The distribution of rainfall throughout the year was extremely irregular; the number of wet days in the year amounted to 184. The most prevalent winds were from north-west, 25 per cent., and from south-west, 23 per cent. The French Meteorological Office has published in its *Annales* the observations made at the summit of the mountain since October 1881, at a still greater altitude; these will, no doubt, be dealt with in a subsequent paper.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 24.—"Measurements of the Absolute Specific Resistance of pure Electrolytic Copper." By J. W. Swan and J. Rhodin.

This paper is a record of measurements of the absolute specific resistance and temperature coefficient of pure electrolytic copper. The authors compared a large number of different specimens of electrolytic copper. Several of the specimens were at first roughly examined, and the best chosen for further investigation. The best of these was then electrolytically refined. This, without previous fusion, was drawn through sapphire dies to the requisite diameter, and the resulting wire subjected to careful measurements. The first specimen, "A," was measured both when hard and also after annealing at a red heat in an atmosphere of carbon dioxide gas; the second sample, "B," was only examined after annealing. The authors took extreme care in finding the dimensions of the wires and the temperatures at which they were measured.

The values of the two specimens in C.G.S. units were as follows, the density being 8·9587 at 15° C.

			Absolute specific resistance. C.G.S. units.	Temp. coefficient. Δt.
Sample	A.	Hard, as drawn......	1603	0·00408
,,	A.	Soft, as annealed....	1566	0·00418
,,	B.	Soft, as annealed....	1559	0·00415

May 31.—"On Rapid Changes of Atmospheric Temperature, especially during Föhn, and the Methods of observing them." By J. Y. Buchanan, F.R.S.

In July 1893, on the west coast of Scotland, föhn of a well-defined type prevailed. It was characterised by puffs of very hot air occurring every two or three minutes in the midst of the abnormally warm air of the day. On July 7 and 8 these hot puffs were felt very strongly, and especially on the water. Attempts to measure their temperature with a thermometer proved unavailing, as their temperature was so high and their duration so short that the thermometer had only begun to rise when the heating cause had passed. Between August 18 and 23 exactly the same character of weather was observed in the valleys around Pontresina in the Engadine. The hot puffs were very remarkable. The weather was recognised by the people as "föhn." Here the inadequacy of the thermometer as usually employed was again apparent. Observations were made on the exchange of heat taking place between the hot föhn wind and the Morteratsch glacier over which it was blowing. The temperature of the air was observed at a station on the glacier, and at a station at the same altitude on the mountain at its side. The temperature of the air at the land station was found very variable, altering as much as 2° C. in five minutes. By making a number of observations during quarter of an hour a mean value was obtained for comparison with the temperature over the ice. On land the average temperature of the air in the afternoon was 16·5 C.; over the ice, and at a height of one metre above it the temperature was 10° C., and when the thermometer was laid horizontally with its bulb at distances between two centimetres and two millimetres from the ice, the lowest temperature of the air in that position was 5°·5 and the highest 7°·5. The wind blew over the glacier at a speed of eight to ten kilometres per hour, and was a fresh breeze, which might have been expected to thoroughly mix the air, yet the result of repeated observations showed that well-defined temperature gradients were produced and maintained in the air between the ice and a height of a metre above it. Between one metre and one millimetre above the ice the gradient is moderate, averaging 3°·5 per metre. In the thin layer next the ice the gradient is precipitous. The occurrence of the highly-heated puffs of air due to the föhn directed attention to the measurement of rapid variations of temperature generally. An approximation was made to their estimation by noting the rate at which the thermometer began to rise in one of these puffs, and then determining experimentally the excess of temperature of the air required to produce this effect. This could not be satisfactorily done at the time, but attention was paid to it later.

This method seemed to be the only one by which ordinary thermometers can be made to indicate truthfully changes of temperature which are not extremely slow. The method was applied in the case of a series of temperatures observed at very close intervals during the first two hours after sunrise on several days in February at St. Moritz. The temperature of a thermometer freely exposed to the north was observed at intervals of twenty seconds. These are summarised in a table. The temperature exhibited generally two falls for every three to four rises; the largest rise or fall in twenty seconds was 0°·5 C. From careful experiments on the rate of cooling of the thermometer, both in a room and in the open air when the air was still, it resulted that to produce a rise of temperature of 0°·5 in twenty seconds, the temperature of the air at the beginning of the interval must have been at least 2°·25 C. higher than that of the thermometer at the same instant. If there had been a fall of the same amount, then the temperature of the air must have been as much lower than that of the thermometer at the beginning of the interval. So that if, in any two consecutive intervals of twenty seconds, the thermometer showed a rise of 0°·5 and a fall of the same amount, the apparent temperature of the air at the beginning and the end of the interval is the same, whereas the true temperatures differ by 2 × 2·25 – 0°·5 or 4°·0 C. A table is given in the paper of the temperatures observed at intervals of twenty seconds during a few minutes on February 26, when the variations were considerable. The differences of temperatures required to produce the observed changes are given, and from them the amended or true temperatures are deduced and tabulated. The true variations of temperature are naturally much more abrupt than the apparent ones.

The concluding part of the paper deals with the employment of the thermometer as a calorimeter. For this purpose it is necessary, besides the rate of cooling, to know the "thermal mass" or water value of the bulb. A method is indicated by which this can be ascertained with very considerable accuracy by the measurement of the volume of the bulb. The circumference of the bulb is best determined by winding fine thread round it in a close spiral for a certain number of turns, then measuring the length of the unrolled thread. When the specific heat of mercury and that of ordinary glass are expressed in terms of unit volume they are very nearly identical; namely, 0·449 for mercury, and 0·466 for glass. It is clear that if the mean of the two is taken to represent the specific heat of the bulb, an error of not more than two per cent. is made in the extreme case when the bulb consists of all mercury or all glass. When the thermal mass and the rate of cooling of a thermometer have been determined, its usefulness as a metereological instrument is increased manifold.

Chemical Society, May 17.—Dr. Armstrong, President, in the chair.—The following papers were read:—The influence of moisture on chemical change, by H. B. Baker. Highly purified lime and carefully dried copper oxide do not combine with sulphur trioxide; dry ammonium chloride may be sublimed from a mixture with lime without the liberation of ammonia. Pure dry nitric oxide gives no brown fumes with dry oxygen, although the addition of a trace of moist air causes immediate interaction. Carefully dried ammonium chloride does not dissociate on volatilisation, the vapour having the density 28·7.—New volatile compounds of lead sulphide, by J. B. Hannay. The observed volatility of lead sulphide in water vapour may be explained by assuming the existence of gaseous compounds of lead sulphide and water; the author concludes that a definite compound of the composition PbS, H_2O exists. Evidence in support of the existence of a compound of the composition PbS,SO_2 is also brought forward; both these substances are colourless gases at a red heat, but decompose below 800°.—Notes on the cupellation of bismuth-silver alloys, by E. A. Smith.—Azo-*p*-cresol derivatives, by R. Meldola and F. Southerden. The authors have endeavoured to determine the constitution of several ortho-azo-derivatives of paracresol by treating their acetyl derivatives with nitric acid or bromine.—Effect of heat on iodates and bromates, by E. H. Cook. During the fusion of potassium bromate and iodate, bromine and iodine are respectively evolved; no halogen is given off after melting is complete, and after continued heating to drive off all the oxygen, only potassium bromide or iodide remains.

Geological Society, May 23.—Dr. Henry Woodward, F.R.S., President, in the chair.—On the stratigraphy and physiography of the Libyan Desert of Egypt, by Captain H. G. Lyons, R.E. The Nubian sandstone, wherever seen, rests unconformably on the old rocks called by Sir J. W. Dawson Archæan, and the author found no case of alteration of sandstone by these rocks, though in one case it is altered by an intrusive dolerite. The author considered the Nubian sandstone to be an estuarine deposit which was formed on an area afterwards gradually invaded by the Cretaceous sea. He considered the whole of the sandstone in the region which he had examined to be of Cretaceous age. He described a series of anticlinals, one set running W.N.W.-E.S.E., and the other N. by E. and S. by W. Many springs of the oases seem to occur along these anticlinals, owing to the beds which contain the water being brought nearer to the surface. Historical evidence was discussed which points to the Nile having reached a higher level in Nubia than it does at present, and it was suggested that variations in the level of the river were caused by earth-movement opposing obstructions to the river's flow. The sandstone of Jebel Ahmar near Cairo was described, and its occurrence over a wide area west of Cairo recorded. The author considered its age to be later Miocene. He believed that, with the exception of some erosion after the deposition of the Eocene beds, the greatest erosion, including the cutting out of the Nile Valley, took place in Miocene times, while a certain amount, bringing the area to its present condition, was done in Quaternary times. This agrees with the observations of the French geologists in Algeria. The origin of the silicification of the fossil trees of the sandstone-deposits was discussed, and the action of water containing sodium carbonate suggested as a cause. The President, Mr. Hudleston, and the Rev. G. Henslow having made remarks upon the paper, Prof. Hull said he concurred with the view of the author that the course of the Nile above Cairo had been determined by the line of fault, which follows the valley for many miles upward. As regards the age of the Nile in Egypt, he considered it as referable to the Miocene stage rather than to the Pliocene. The Miocene period in that part of the world was one in which the main features of the present land-areas received their general contours. Referring to an observation by Mr. Hudleston regarding the absence of carboniferous beds in the Nile Valley, he reminded the Society that deposits of this age had been discovered by Dr. Schweinfurth in the Wady-el-Arabah between the Nile and the Gulf of Suez. Dr. Irving, remarking on the silicification of wood, said he wished again to emphasise the difference in the action of carbonic acid in petrological changes, according as it existed as a free acid or in combination with a base, as in sodium carbonate. The extent of the "Natron" deposits pointed to the supply of alkaline waters over large areas in former times, holding the mineral in solution. The reaction of such waters upon the potash-felspar of the sands, furnished by the disintegration of the crystalline rocks, would not lead to the deposition of free silica (as in the ordinary process of kaolinisation), because, while the potassium was taken up as a carbonate and carried away, the silica was also removed in solution, through combination with the sodium, to form sodium silicate. This last-named salt in solution would be readily decomposed by the organic acids and the carbonic acid furnished by decaying vegetable tissue, the silica being then deposited as a colloid *in situ*, and thus retaining the structural forms of the original tissue. The author briefly replied.—Notes on the geology of South Africa, by Mr. D. Draper. The district considered includes Natal, Zululand, Swaziland, the south-east part of the Transvaal, and the eastern part of the Orange Free State and of Basutoland. Physically it comprehends:—(1) The Drakensberg Range; divided into (*a*) mountain portion; (*b*) hill-covered plateau; (*c*) Highveld plateau; (2) the terrace along its foot; (3) the coast-belt. Their main features and characteristics were described. The geological formations are:—

Karoo Beds.	Upper.	1. Volcanic Beds.
		2. Cave Sandstone.
		3. Red Beds.
		4. Molteno Beds.
	Lower.	5. Beaufort Beds.
		6. Ecca Beds.
		7. Dwyka (Ecca) Conglomerate.
Palæozoic.		[Bokkeveld Beds, wanting,]
		8. Gats Rand (Zuurberg) Quartzite.
		9. Dolomitic Limestone.
		10. Table-mountain Sandstone.
		11. Malmesbury Schists.
		12. Gneiss and Granite.

—On the occurrence of dolomite in South Africa, by the same author. A peculiar calcareo-siliceous rock, near Lydenburg, described by Messrs. Penning and Crutwell as "Chalcedolite," and a similar rock mentioned by Mr. Penning as overlying the "Blackreef Series" of the Megaliesberg formation, have been recognised as a dolomite. Mr. C. Alford has described a "calcareous quartzite" as passing into dolomite and ultimately into chert, and known as the "Elephant-rock" in Transvaal, sometimes cavernous with underground waters. From his own experience Mr. Draper has recognised the "Elephant-rock" in the Potschefstroom, Lichtenburg, Malmani, and Lydenburg districts as a real dolomite, with interstratified siliceous bands, weathering into a brown earth like manganese oxide and superficial siliceous débris. It has its place between the Table-mountain sandstone and the quartzite of the Gats Rand (= Zuurberg quartzite of the Cape). It has auriferous veins in Malmani and Lydenburg. Dr. Schrenck has noticed a similar dark-blue dolomitic limestone in Great Namaqualand. The deep water-holes in it in Malmani are comparable with those found by F. Galton in West Central Africa. The great caves in Mashonaland may belong to it. The extensive tufaceous deposits in Griqualand-West, the Transvaal, and Orange Free State were probably derived from this extensive dolomite. Mr. Rutley, Mr. Nicol Brown, and Prof. T. Rupert Jones took part in the discussion that followed. — Contributions to the geology of British East Africa, by Dr. J. W. Gregory. The author described moraines, striæ, glacial lake-basins, perched blocks, and *roches moutonnées* below the present limits of the glaciers of Mount Kenya, which he maintained to indicate the existence of a "calotte" or ice-cap extending at least 5400 feet farther down the mountain than the termination of the present glaciers, and possibly farther, for in the belt of forest detailed observations could not be made. He agreed that this more extensive glaciation was produced by a greater elevation of Mount Kenya, and that any theory of universal glaciation is unnecessary, and indeed opposed by many facts in African geology. He discussed the probable influence of this former glaciation on the meteorological conditions of the surrounding area and the distribution of its flora and fauna.

PARIS.

Academy of Sciences, June 4.—M. Lœwy in the chair.—On the composition of apophyllite, by M. C. Friedel. No positive evidence of the presence of fluorine in this mineral could be obtained with specimens from Bou Serdoun (Algeria). Instead of an acid reaction, the water evolved possessed an alkaline reaction in the cases of specimens from Bou Serdoun, Andreasberg, Guanajuato (Mexico), Greenland, Nova Scotia, and Utö (Sweden). There is no fluorine in the samples examined; that reported by previous observers is probably due to the imperfect methods of analysis employed; on the other hand, they contain ammonia in quantity varying from 0·03 to 0·5 per cent., possibly replacing a part of the potassium. The evidence available is insufficient to settle the formula expressing the composition of apophyllite.—Report on a memoir by M. Bazin on experiments on the contraction of liquid jets and the distribution of velocities in their interior, by MM. Resal, Maurice Levy, Sarrau, and Boussinesq.—Transmission of sounds, by M. Henri Gilbault. The amplitudes of vibration being represented by y, and distances by x, it is shown that the law $xy =$ a constant is not verified in practice for small values of x.—On the value of the theoretical ohm, by M. A. Leduc. The author shows that a part of a correction, considered unimportant by M. Wuilleumier, must be applied to the results obtained by the latter according to M. Lippmann's method. These results then give for the length of a column of mercury at 0° C. and of 1 sq. mm. section representing the theoretical ohm, the value 106·32 cm. in place of 106·267 cm. The revised value is in close accord with the mean of the best determinations made by other methods.—On the method of transformation of work into electric energy, by M. Vaschy.—On alternating currents and Wheatstone's bridge, by M. H. Abraham. A method is described for obtaining the frequency of the alternations by bridge measurements.—The *skiascope-optomètre*, by M. H. Sureau. A description of the use and parts of an instrument for the examination of the eye by opticians.—New researches on the chloroboracites, by MM. G. Rousseau and H. Allaire. The author describes the production and properties of compounds of zinc, cadmium, nickel, cobalt, and manganese having the general formula $6MO . 8B_2O_3 . MCl_2$.—On the *rôle* of the transformations of iron and carbon in the hardening of steel, by M. Georges Charpy. The following conclusions are drawn from the experimental results given. Hardening produces, among other modifications, a transformation of the iron (characterised by the breaking strain) and a transformation of the carbon (characterised by the variation of the results by the Eggertz test). The transformation of the iron appears to have but a feeble influence on the breaking strain, whereas the transformation of the carbon appears to be correlative with the augmentation of hardness.—On a hydrobromide of cupric bromide and on a red bromide of copper and potassium, by M. Paul Sabatier. The formula $CuBr_2 . HBr . 2H_2O$ is attributed to the substance obtained in black *chatoyant* crystals by cooling a concentrated solution of cupric bromide into which hydrogen bromide has been passed. The double compound with potassium is $CuBr_2 . KBr$. It forms fine, deliquescent, rhombic plates, which are very opaque and apparently black, but are seen to be red in thin sections.—On the analytical separation of chlorine and bromine, by M. R. Engel. The bromine is separated by oxidation with ammonium persulphate, and distilled off into a sulphurous acid solution, from which it is precipitated as silver bromide. Under the conditions given, the chlorine is not affected.—On the detection of hydrobromic acid, by MM. A. Villiers and M. Fayolle.—New derivatives of cyanacetic and cyanosuccinic esters, by M. L. Barthe.—Combinations of pyridine with the permanganates, by M. T. Klobb. A series of compounds parallel with the ammonia derivatives previously described and of the general formula $MMnO_4 . 2C_5H_5N$ or $MMn_2O_8 . 4C_5H_5N$ are given.—On the emetics, by M. Paul Adam. The conclusion is drawn that substances of the emetic type should be considered as ether salts and not double salts.—On monoethylphosphoric acid, by M. J. Cavalier. This acid exhibits, thermally, two clearly distinct functions and gives two series of definite salts, corresponding with the formulæ PO_4EtMH and PO_4EtM_2.—Action of trioxymethylene on alcohols in presence of ferric chloride, and on the new methylene derivatives which result, by MM. A. Trillat and R. Cambier.—Mechanism of the action of chlorine on isobutylic alcohol, by M. A. Brochet.—Researches on the red pigmentary matter of *Pyrrhocoris apterus* (L.), by M. C. Phisalix.—On the relations between the dorsal cord and the hypophysis in birds, by M. G. Saint-Remy.—On a new *grégarine* of the family of the Dactylophorides, parasitic on Geophiles, by M. Louis Léger.—On a *Ustilaginée* parasitic on the beet-root (*Entyloma leproideum*), by M. L. Trabut.—On a vine disease caused by *Botrytis cinerea*, by M. L. Ravaz.—Contribution to the study of *géoclases conjuguées*, by M. Stanislas Meunier.—Variations of the latent period of coagulation of milk soured by rennet, by M. C. Pagès.

DIARY OF SOCIETIES.

London.

THURSDAY, June 14.

Royal Society, at 4.30.—Flame Spectra at High Temperatures—Part II. The Spectrum of Metallic Manganese, of Alloys of Manganese, and of Compounds containing that Element. Part III. The Spectroscopic Phenomena and Thermo-chemistry of the Bessemer Process: Prof. Hartley, F.R.S.—The Complexity and the Dissociation of the Molecules of Liquids: Prof. Ramsay, F.R.S.—(1) The Molecular Surface-energy of the Esters, showing its Variation with Chemical Constitution; (2) The Molecular Surface-energy of Mixtures of Non-associating Liquids: Prof. Ramsay, F.R.S., and Miss Emily Aston.—On a Method of Determining the Thermal Conductivity of Metals, with Applications to Copper, Silver, Gold, and Platinum: James H. Gray.

Mathematical Society, at 8.—The Solutions of Two Differential Equations: F. H. Jackson.—A Theorem in Inequalities: A. R. Johnson.—Some Properties of a Circle: R. Tucker.—Note on Four Special Circles of Inversion of a System of Generalised Brocard Circles of a Plane Triangle: J. Griffiths.—On the Order of the Eliminant of Two or more Equations: Dr. R. Lachlan.

FRIDAY, June 15.

Quekett Microscopical Club (20 Hanover Square, W.) at 8.

SATURDAY, June 16.

Geologists' Association.—Excursion to Gravesend and Northfleet. Directors: Prof. T. Rupert Jones, F.R.S., and F. C. J. Spurrell.

Yorkshire Naturalists' Union.—Meeting at Pontefract for the Investigation of the Neighbourhood of Ferrybridge, &c.

MONDAY, June 18.

Royal Geographical Society, at 8.30.—A Survey of the English Lakes (with Illustrations): Dr. Hugh Robert Mill.

TUESDAY, June 19.

Royal Statistical Society (Museum of Practical Geology, 28 Jermyn Street, S.W.), at 7.45.—A Comparison of the Realised Wealth and of the Economic Condition of France and England, especially as relating to their Agricultural Production and their Security in case of War: Mr. William J. Harris.

Zoological Society, at 8.30.—On Lepidosiren and Protopterus: Prof. Ray Lankester, F.R.S.—Notes on some Specimens of Antlers of the Fallow Deer showing Continuous Variation and the Effect of Total or Partial Castration: Dr. G. Herbert Fowler.—On the Perforated Flexor Muscles in some Birds: Mr. P. Chalmers Mitchell.

Mineralogical Society, at 8.—A Chemical Study of some Native Arseniates and Phosphates: Prof. A. H. Church, F.R.S.—The Occurrence of Mispickel in the Stewartry of Kirkcudbright: P. Dudgeon.

WEDNESDAY, June 20.

Geological Society, at 8.—On Deep Borings at Culford and Winkfield, with Notes on those at Ware and Cheshunt: W. Whitaker, F.R.S., and A. J. Jukes-Browne.—On the Bargate Stone and the Pebble-beds of Surrey, with especial regard to their Microscopic Contents: Frederick Chapman.—On Deposits from Snowdrift, with special reference to the Origin of the Loess and the Preservation of Mammoth-remains: Charles Davison.—Additions to the Fauna of the Olenellus-zone of the North-West Highlands: B. N. Peach, F.R.S.—Questions relating to the Formation of Coal-Seams, including a New Theory of them: suggested by Field and other Observations made during the past decade on both sides of the Atlantic: W. S. Gresley.—Observations regarding the Occurrence of Anthracite generally, with a New Theory of its Origin: W. S. Gresley.—The Igneous Rocks of the Neighbourhood of Builth: Henry Woods.—On the Relations of some of the Older Fragmental Rocks in North-West Caernarvonshire: Prof. T. G. Bonney, F.R.S., and Miss Catherine Raisin.

Royal Microscopical Society (20 Hanover Square, W.), at 8.—On the Unreliability of certain Characters generally accepted for Specific Diagnosis in the Diatomaceæ: Mr. T. Comber.—Foraminifera of the Gault of Folkestone: Mr. T. Chapman.

Royal Meteorological Society, at 8.—Fogs reported with Strong Winds during the Fifteen Years 1876-90 in the British Isles: Robert H. Scott, F.R.S.—Some Characteristic Features of Gales and Strong Winds: Richard H. Curtis.

THURSDAY, June 21.

Royal Society, at 4.30.—The following Papers will *probably* be read:—On the Absorption Spectra of Dilute Solutions: Dr. T. Swan.—On some Phenomena in Vacuum-tubes: Sir D. Salomons.—On Operators in Physical Mathematics, Part III.: O. Heaviside.—On the Structure and Affinities of Heliopora cærulea (Pall.), with some Observations on the Structure of Xenia and Heteroxenia: Albert C. Bourne.—On the Differential Invariants of Twisted Curves, with some Illustrations of the Application to Quartic Curves: R. F. Gwyther.—Degenerations consequent on Experimental Lesions of the Cerebellum: Dr. Risien Russell.—Measurement of Colour produced by Contrast: Captain Abney, F.R.S.—On the Singular Solutions of Simultaneous Ordinary Differential Equations and the Theory of Congruencies: Prof. A. C. Dixon.—And other Papers.

Linnean Society, at 8.—On Tabulation Areas: C. B. Clarke, F.R.S.

Chemical Society, at 8.—The Specific Character of the Fermentation Functions of Yeast Cells: Adrian J. Brown.—The Interaction of Lead Sulphide with Lead Sulphate and Oxide: J. B. Hannay.—The Oxidation of Tartaric Acid in the Presence of Iron: H. J. H. Fenton.—The Relation between the Solubility of a Gas and the Viscosity of its Solvent: Prof. Thorpe, F.R.S., and J. W. Rodger.—And other Papers.

FRIDAY, June 22.

Physical Society, at 5.—An Exhibition of Photographs of Flames: Captain Abney.—An Elementary Theory of Planimeters: Prof. Henrici.—The Hatchet Planimeter: F. W. Hill.—A New Integrating Apparatus: A. Sharp.—Other Papers if time allows.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

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